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10/090,275	03/04/2002	Joseph F. Sinnott JR.	SVL920010088US1	6540

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EXAMINER	
LE, DEBBIE M	

ART UNIT	PAPER NUMBER
2177	2

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/090,275	Applicant(s) SINNOTT, JOSEPH F.	
	Examiner DEBBIE M LE	Art Unit 2177	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-8,11-14,17 and 18* is/are rejected.

7)☒ Claim(s) *3-4, 9-10, 15-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 March 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawings were received on March 4, 2002. These drawings are approved by the examiner.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-2, 5-8, 11-14, 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Krishna (U.S Patent 6,136,111).

As per claim 1, Krishna discloses the recited limitations as follows:

'a computer-based method for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], the method comprising the steps of:

The Italicized text represent portions of prior art that are mapped to the claim limitations.

'a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32];

'a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

As per claim 2, Krishna teaches 'wherein the first pass performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R* [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost*

The Italicized text represent portions of prior art that are mapped to the claim limitations.

estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders [See col. 3, lines 52-55].

As per claim 5, Krishna teaches 'wherein the second pass performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 6, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

As per claim 7, Krishna discloses the recited limitations as follows"

'a computer-based processor system for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], 'the system comprising:

means for performing a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32]; and

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The Italicized text represent portions of prior art that are mapped to the claim limitations.

'means for performing a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

As per claim 8, Krishna teaches 'wherein the first pass means performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R* [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders* [See col. 3, lines 52-55].

The Italicized text represent portions of prior art that are mapped to the claim limitations.

As per claim 11, Krishna teaches 'wherein the second pass means performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 12, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

As per claim 13, Krishna discloses the recited limitations as follows:

'a computer usable medium tangibly embodying a program of instructions executable by the computer to perform a computer-based method for determining the optimum join sequence for processing a query having a plurality of tables from a relational database stored in an electronic storage device having a database management system' *as the process of a join order optimization for a multiple join queries in a relational database management system* [See col. 1, lines 5-6], 'the method comprising the steps of:

'(a) a first pass for determining an optimum join sequence for joining the plurality of tables from the query' *as the calculating an optimal order for join of tables in a multiple join query* [See Fig. 1, col. 3, lines 24-26, 31-32]; and

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The Italicized text represent portions of prior art that are mapped to the claim limitations.

'(b) a second pass for using the optimum join sequence for creating a lowest cost access path plan for processing the query' *as a join order selected among other possible join orders, wherein the selected join order has the smallest sigma (i.e., lowest cost) and the optimal access path to perform the join query* [See Fig. 2, col. 3, lines 44-50].

As per claim 14, Krishna teaches 'wherein the first pass performing successive steps until creation of a simulated composite table having all tables from the query' *as a joining of a plurality of tables R, S, and T from the query* [See col. 3, lines 31-32]. *There are two possible join orders for the tables R, S, and T. The first (1) possible join order is join tables R and S, then join the result with table T; the second (2) possible join order is join tables S and T, then join the result with table R* [See col. 3, lines 33-35], 'wherein each said step:

creating a set of miniplans for simulating all possible joins of a predetermined subset of the query tables' *as after joining the two possible join orders, the calculation of the total query for the join order (1) is 80(20+60) and the join order (2) is 560(500+60) are created* [See col. 3, lines 35-41]; and

'using a cost model calculations for estimating and saving the least expensive join from said set of joins, thereby determining the optimum join sequence' *as the cost estimate calculations for the join order (1) is 80 and the join order (2) is 560. Thus, the join order (1) is indicated the least expensive join order from the set of join orders* [See col. 3, lines 52-55].

The Italicized text represent portions of prior art that are mapped to the claim limitations.

As per claim 17, Krishna teaches 'wherein the second pass performing successive steps until creation of a simulated composite table having all tables from the query, wherein each said step being performed in the optimum join sequence' *as if the join orders remain to be examined, the process repeats for the next possible join order. A join order with the smallest value is used to perform the join query* [See col. 4, lines 4-7].

As per claim 18, Krishna teaches 'wherein the query being a SQL query' *as an SQL query* [See col. 4, lines 38-40].

Allowable Subject Matter

The prior art of record fails to teach a combination of elements including wherein the first pass for each said miniplan storing a used table index, sorting data, and for each said least expensive join storing names of joined tables, and possible row orderings as recited in dependent claims 3, 9 and 15.

Claims 3-4, 9-10, 15 and 16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The Italicized text represent portions of prior art that are mapped to the claim limitations.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S Patent 6,397,204 B1, issued to Liu et al on May 28, 2002. The subject matter disclosed therein is selecting one index from the fact table to determine the join orders for a query. A cost estimate is then made for each of the join orders based on the indexes on the fact table. The best cost join order is then selected to perform the query join.

U.S Patent 6,421,657 B1, issued to Sinnott et al on July 16, 2002. The subject matter disclosed therein is calculating the lowest cost join permutation for join queries. The cost of all possible joins from a table composites are compared to a threshold. If the cost is not exceed the threshold value and saving the lowest cost.

U.S Patent 6,643,636 B1, issued to Au et al on November 4, 2003. The subject matter disclosed therein is when the join index does not contain all of the entire query set of the columns from a user sumits a SQL request. A join back condition is added to the WHERE clause of the query. The cover tables from the from clause is removed. The optimizer then evaluates the cost of different join paths and the least expensive join path is implemented to the query.

U.S Patent 6,516,310 B1, issued to Paulley on February 4, 2003. The subject matter disclosed therein is an optimal join order is determined and used as an access plan for executing a relational database query.

The Italicized text represent portions of prior art that are mapped to the claim limitations.

U.S Patent 5,671,403, issued to Shekita et al on September 23, 1997. The subject matter disclosed therein is an iterative dynamic programming system parses a query into join queries for optimization of query plans.

U.S Patent 6,370,522 B1, issued to Agarwal et al on April 9, 2002. The subject matter disclosed therein is a query optimization for executing of the database statements to calculate the cost of execution plans.

U.S Patent 6,377,943 B1, issued to Jakobsson on April 23, 2002. The subject matter disclosed therein is parsing a query to determine the join operations, determining a join order of the join operations by generating a plurality of initial join orderings, determining local best join orders based on the initial join orderings, and selecting the best of the local best join orders and executing the query based on the join order.

U.S Patent 5,600,829, issued to Tsatalos et al on Feb. 4, 1997. The subject matter disclosed therein is a database management system integrates with an optimizer accepts a user query and compare it to the sub-queries of the tables to generates a list of tables. Tables of joined sub-queries may be removed from the list if their joined sub-queries include a smaller portion of the user query and have a greater search cost then another joined sub-queries.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEBBIE M LE whose telephone number is 703-308-6409. The examiner can normally be reached on 8:30-5:00.

The Italicized text represent portions of prior art that are mapped to the claim limitations.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, JOHN BREENE can be reached on 703-305-9790. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

DEBBIE M LE
Examiner
Art Unit 2177

Debbie Le

Aug. 20, 2004.

The Italicized text represent portions of prior art that are mapped to the claim limitations.